

Optically-Coupled Isolator

Photoelectronic Products

General Description

The H11A1, H11A2, H11A3 and H11A4 optical isolators are electrical and mechanical replacements for the General Electric series. Optical intercoupling provides a high degree of ac and dc isolation. A capability for continuous operation of the input diode results in a frequency response extending to dc. Connection to the base is also provided for design flexibility.

Glassolated™

Electrically Equivalent to GE Devices

Pin-for-Pin Equivalent to GE Devices

Availability of Base Pin for Flexible Design

Absolute Maximum Ratings

Maximum Temperature and Humidity

Storage Temperature -55°C to $+150^{\circ}\text{C}$

Operating Temperature -55°C to $+100^{\circ}\text{C}$

Pin Temperature (Soldering, 5 s) 260°C

Total Package Power Dissipation

at $T_A = 25^{\circ}\text{C}$,

LED plus Detector

Derate Linearly from 25°C

250 mW

3.3 mW/ $^{\circ}\text{C}$

Input Diode

V_R Reverse Voltage 3.0 V

I_F Forward dc Current 60 mA

I_{pk} Peak Forward Current at 1 μs pulse width, 300 pps 3.0 A

P_D Power Dissipation at $T_A = 25^{\circ}\text{C}$ 100 mW/ $^{\circ}\text{C}$

Derate Linearly from 25°C 1.33 mW/ $^{\circ}\text{C}$

Output Transistor

V_{CE} Collector-to-Emitter Voltage 30 V

V_{CB} Collector-to-Base Voltage 70 V

I_C Collector Current 100 mA

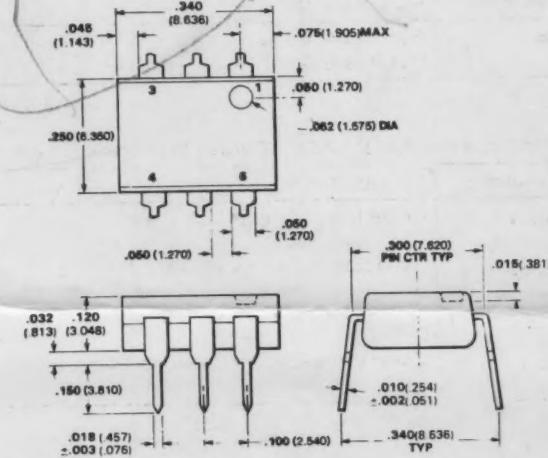
P_D Power Dissipation at $T_A = 25^{\circ}\text{C}$ 150 mW

Derate Linearly from 25°C 2.0 mW/ $^{\circ}\text{C}$

AD
A
AS
I

H11A1, H11A2 H11A3, H11A4

Package Outline



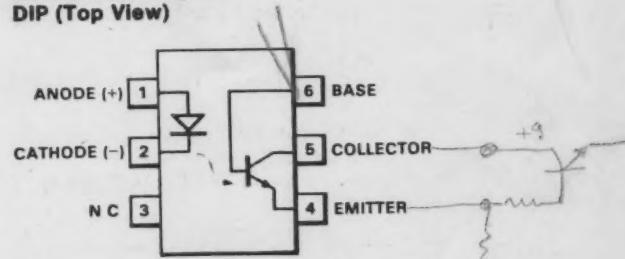
5

Notes

All dimensions in inches bold and millimeters (parentheses)

Tolerance unless specified = $\pm .015$ ($\pm .381$)

Connection Diagram DIP (Top View)

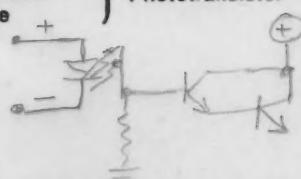


Pin

1 Anode (+)
2 Cathode (-) }

3 NC
4 Emitter
5 Collector
6 Base }

Input Diode
Output npn
Phototransistor



Typical Electrical Characteristics

H11A1, H11A2
H11A3, H11A4

Optically-C
Darlington
Optoelectronic Product

Electrical Characteristics—Input Diode $T_A = 25^\circ C$

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
V_F	Forward Voltage		1.1	1.5	V	$I_F = 10 \text{ mA}$
I_R	Reverse Current			10	μA	$V_R = 3.0 \text{ V}$

Electrical Characteristics—Output Transistor $T_A = 25^\circ C$

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
V_{CEO}	Collector-to-Emitter Voltage	30			V	$I_C = 10 \text{ mA}$, $I_F = 0$
V_{CBO}	Collector-to-Base Voltage	70			V	$I_C = 100 \mu\text{A}$, $I_F = 0$
V_{ECO}	Emitter-to-Collector Voltage	7.0			V	$I_E = 100 \mu\text{A}$, $I_F = 0$
I_{CEO}	Collector-to-Emitter Leakage Current		5.0	50	nA	$V_{CE} = 10 \text{ V}$, $I_F = 0$

Electrical Characteristics—Coupled $T_A = 25^\circ C$

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
V_{ISO}	Isolation Voltage (Note 3) H11A1, H11A3 H11A2, H11A4	2500 1500			V	Peak
$V_{CE(\text{sat})}$	Collector-to-Emitter Saturation Voltage		0.1	0.4	V	Peak
$I_C/I_F(\text{CTR})$	Collector Current Transfer Ratio (Note 1) H11A1 H11A2, H11A3 H11A4	50 20 10 10 ¹¹			%	$I_C = 0.5 \text{ mA}$, $I_F = 50 \text{ mA}$ $V_{CE} = 10 \text{ V}$, $I_F = 10 \text{ mA}$
R_{IO} C_{IO} t_r, t_f	Input-to-Output Resistance Input-to-Output Capacitance Collector Rise and Fall Times (Note 2)		2.0 2.0		Ω pF μs	$V_{IO} = 500 \text{ V}$ $f = 1.0 \text{ MHz}$ $I_C = 2.0 \text{ mA}$, $V_{CE} = 10 \text{ V}$, $R_L = 100 \Omega$

Notes

1. Collector current transfer ratio is defined as the ratio of the collector current to the forward bias input current.
2. Rise time is defined as the time for the collector current to rise from 10% to 90% of peak value. Fall time is defined as the time required for the current to decrease from 90% to 10% of peak value.
3. Isolation voltage defined as minimum of 5 s continuous application.

General Description
The H11B1 and H11B2 and mechanical replacement series. Optical intercoupling and dc isolation. A wide range of operation of the input response extending to also provided for desirability.

Glassolated™
Electrically Equivalent
Pin-For-Pin Equivalent
Availability of Base P

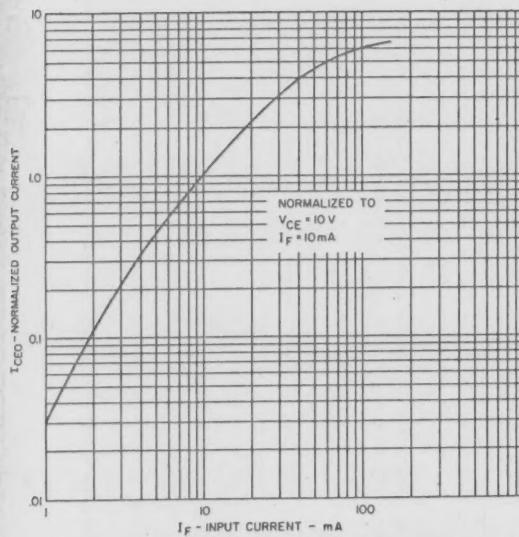
Absolute Maximum Ratings

Maximum Temperature
Storage Temperature
Operating Temperature
Pin Temperature (Soldered)
Total Package Power at $T_A = 25^\circ C$
LED plus Detector
Derate Linearly from 2

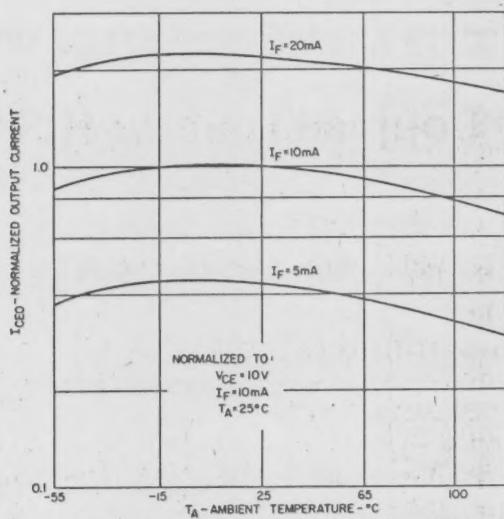
Input Diode
 I_F Forward dc Current
Continuous
 V_R Reverse Voltage
 I_{pk} Peak Forward Current
($1\mu\text{s}$ pulse width)
 P_D Power Dissipative at $T_A = 25^\circ C$
Derate Linearly

Output Transistor (Data)
 V_{CE} Collector to Emitter Voltage
 V_{CB} Collector-to-Base Voltage
 V_{EC} Emitter-to-Collector Voltage
 P_D Power Dissipative at $T_A = 25^\circ C$, I_C (max) = 100 mA
 $V_{CE} = 1.5 \text{ V}$
Derate Linearly

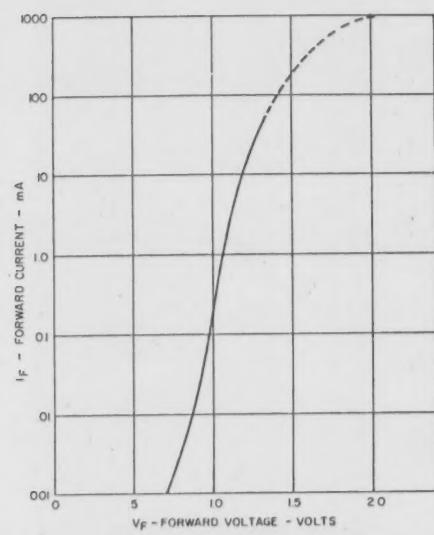
TYPICAL CHARACTERISTICS



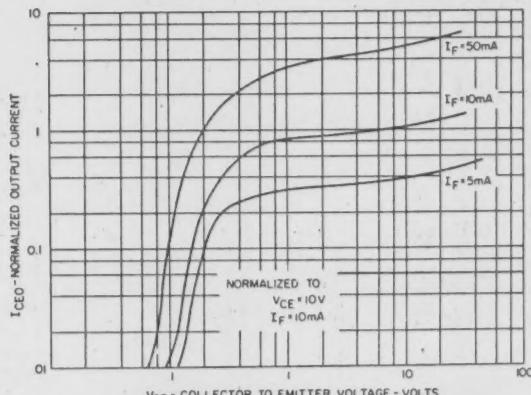
OUTPUT CURRENT VS INPUT CURRENT



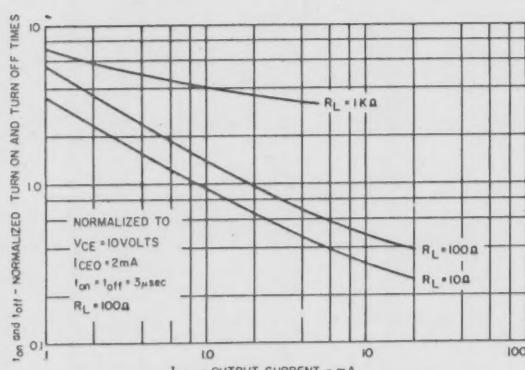
OUTPUT CURRENT VS TEMPERATURE



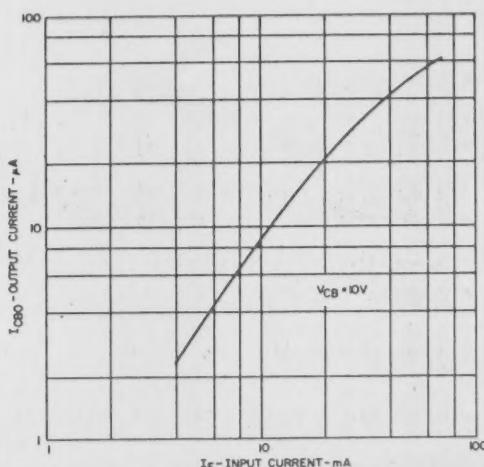
INPUT CHARACTERISTICS



OUTPUT CHARACTERISTICS



SWITCHING TIMES VS OUTPUT CURRENT



OUTPUT CURRENT (I_{CBO}) VS INPUT CURRENT